

REMARKS

Rejections under 35 USC 112, first paragraph

Claims 1 and 21 have been amended to recite that the “water solubility limit of the water-soluble polyurethane is *at least* 0.1%” as suggested by the examiner. Applicant is merely making this amendment in order to expedite prosecution of this case and notes that the cancelled terms “greater than about” were used in a similar context in the application as filed (see claim 5). Applicant understands that this amendment overcomes the rejection under item 3(a) of the final Office Action.

Under item 3(b) of the final Office Action the examiner argues that the claim limitation “wherein the amount of water-soluble polyurethane present in the ink composition is *fully dissolved*” does not satisfy the written description requirement because “there is no disclosure in the specification as originally filed that the polyurethane is fully dissolved.” Applicant respectfully submits that by requiring *express* disclosure of the claim limitation, the examiner is applying too strict a standard. Indeed, it is well established that the written description requirement can also be satisfied through *implicit* or *inherent* disclosure (see MPEP § 2163(II)(3)(b) and cases cited therein). In this context, the examiner is referred to original dependent claim 5 which specifies that the ink composition includes from 0.1 to 5% of a water-soluble polyurethane *and* that the water-soluble polyurethane has a water-solubility limit that is greater than 5% at 25C. By definition the water-soluble polyurethane in the ink composition of claim 5 will be fully dissolved at 25C. The original specification therefore provides implicit disclosure that at the time of filing, the inventors were in possession of ink compositions comprising an amount of water-soluble polyurethane that is *fully dissolved*. For these reasons, the rejection should be removed.

Rejection under 102(a) based on Waki

The rejection of claims 1-3, 6-10 and 17-21 under 35 U.S.C. § 102(a) as being anticipated by Waki et al. (WO 03/097753, hereinafter “Waki”) is hereby traversed, reconsideration is respectfully requested.

As noted above and in the previous response, the pending claims all require that the amount of water-soluble polyurethane present in the ink composition be *fully dissolved*. In order to anticipate the rejected claims, Waki would therefore need to teach at least an ink composition that includes a fully dissolved water-soluble polyurethane. In this context, the examiner argues that:

“Given that WO 03/097753 disclose [sic] that the polyurethane is water-soluble and further given that the polyurethane possesses [sic] acid number as presently claimed, it is clear that the polyurethane would inherently possess [sic] water-solubility limit as presently claimed and would inherently be fully dissolved as presently claimed.”

Applicant disagrees with the Examiner’s reasoning. To establish an inherent anticipation, the extrinsic evidence “must make clear that the missing descriptive matter is *necessarily present* in the thing described in the reference, and that it would be so recognized by persons of ordinary skill. Inherency, however, may not be established by probabilities or possibilities. The mere fact that a certain thing may result from a given set of circumstances is not sufficient.” *In re Robertson*, 49 USPQ2d 1949 (Fed. Cir. 1999). In addition, the teachings of the prior art must be considered *as a whole* including portions that would lead away from the claimed invention. *W. L. Gore & Associates, Inc. v. Garlock, Inc.*, 220 USPQ 303 (Fed. Cir. 1983), *cert. denied*, 469 U.S. 851 (1984).

Here, it cannot be said that the teachings of Waki make clear that the polyurethane of Waki would *necessarily* possess the claimed water-solubility limit or that the polyurethane would *necessarily* be fully dissolved. In fact, as explained below, the explicit teachings of Waki point in the opposite direction.

Waki teaches an ink composition that includes a pigment dispersion (see [0134]-[0141] of US 2004/0242726¹). The components of the pigment dispersion are described in [0024]-[0032] (pigment); [0033]-[0054] (water soluble resin) and [0055]-[0067] (resin having an amide bond and/or a urethane bond). The preparation of the pigment dispersion using these components is described in [0068]-[0073] (resin adsorbed to pigment and free resin); [0074]-[0091] (kneading step); [0092]-[0094] (dispersion state); and [0095]-[0111] (crosslinking treatment). As described in these sections, the preparation method typically² involves:

- (1) mixing the pigment and water-soluble resin (see [0069]);
- (2) kneading the mixture so that the water-soluble resin becomes fixed onto the pigment surface (see [0069] and [0075]);
- (3) dispersing the mixture to produce a pigment dispersion (see [0086]);
- (4) adding the resin having an amide bond and/or a urethane bond (e.g., a polyurethane) to the dispersion (see [0096]); and
- (5) cross-linking one or both of the resins to form a *film coated* on the pigment surface (see [0069], [0072] and [0096]).

From these and other³ teachings in Waki, it will be readily apparent to the person of ordinary skill that even if a water-soluble polyurethane is added in step (4) of the above method it will mostly end up as a solid (i.e., *undissolved*) cross-linked polyurethane film coated onto the surface of the pigment. Since the pending claims all require that the amount of water-soluble polyurethane present in the ink composition be *fully dissolved* they cannot be anticipated (expressly or inherently) by the pigment dispersions of Waki. Withdrawal of this rejection is earnestly requested.

¹ The examiner states that US 2004/0242726 is the English equivalent of Waki. Since Waki is not in English we cannot confirm that they are indeed equivalent. For purposes of this response we are relying on the examiner's assertion but reserve the right to withdraw this assumption if the two references turn out to include material differences in subject-matter.

² This appears to be Waki's preferred method and is consistently used in the Examples. Waki does describe variations on this method in which the different ingredients are added in different orders but in each case the final product will include a significant amount of solid (i.e., *undissolved*) cross-linked polyurethane film coated onto the surface of the pigment.

³ See for example the discussion of gel fraction calculations in [0112]-[0118] wherein the *solid* content of the pigment is compared with and without cross-linking step (5). See also the Examples that each describe pigment dispersions with gel fractions that exceed 35%.

Rejection under 103(a) based on Waki and Iu

The rejection of claims 11-12 under 35 U.S.C. § 103(a) as being unpatentable over Waki in view of Iu et al. (US 6102998, hereinafter “Iu”) is hereby traversed, reconsideration is respectfully requested.

As discussed above, Waki does not teach each and every element and limitation of the rejected claims. Iu is cited as a secondary reference that teaches a co-solvent found in dependent claims 11-12. The Examiner does not point to any teaching in Iu that could remedy the aforementioned deficiencies in the teachings of Waki. Since Waki does not teach each and every element and limitation of the rejected claims and since Iu does not remedy this failure, claims 11-12 that depend from claim 1 cannot be found obvious in light of any combination of the two references. Withdrawal of this rejection is earnestly requested.

Rejection under 103(a) based on Waki and Ma

The rejection of claims 13-14 under 35 U.S.C. § 103(a) as being unpatentable over Waki in view of Ma et al. (US 5648405, hereinafter “Ma”) is hereby traversed, reconsideration is respectfully requested.

As discussed above, Waki does not teach each and every element and limitation of the rejected claims. Ma is cited as a secondary reference that teaches the desirability of inks with viscosities of less than 10 cps (dependent claims 13-14 require viscosities in the range 1.5 to 6 cps and 2 to 3.4 cps, respectively).⁴ The Examiner does not point to any teaching in Ma that could remedy the aforementioned deficiencies in the teachings of Waki. Since Waki does not teach each and every element and limitation of the rejected claims and since Ma does not remedy this failure, claims 13-14 that depend from claim 1 cannot be found obvious in light of any combination of the two references. Withdrawal of this rejection is earnestly requested.

⁴ Applicant respectfully notes that the generic suggestion that inks with viscosities of less than 10 cps exhibit beneficial properties falls far short of teaching the specifically claimed ranges. Applicant also notes that claims 13-14 further require that the ink have a specific surface tension.

Rejection under 103(a) based on Waki and Elwakil

The rejection of claims 15-16 under 35 U.S.C. § 103(a) as being unpatentable over Waki in view of Elwakil (US 5833743, hereinafter “Elwakil”) is hereby traversed, reconsideration is respectfully requested.

As discussed above, Waki does not teach each and every element and limitation of the rejected claims. Elwakil is cited as a secondary reference that teaches a pH range limitation found in dependent claims 15-16. The Examiner does not point to any teaching in Elwakil that could remedy the aforementioned deficiencies in the teachings of Waki. Since Waki does not teach each and every element and limitation of the rejected claims and since Elwakil does not remedy this failure, claims 15-16 that depend from claim 1 cannot be found obvious in light of any combination of the two references. Withdrawal of this rejection is earnestly requested.

Rejection under 103(a) based on Hirasa and Hayashi

The rejection of claims 1-10 and 17-24 under 35 U.S.C. § 103(a) as being unpatentable over Hirasa et al. (US 2002/0019458, hereinafter “Hirasa”) in view of Hayashi (US 6500248, hereinafter “Hayashi”) is hereby traversed, reconsideration is respectfully requested.

The examiner argues that in light of the combined teachings of Hirasa and Hayashi, it would have been obvious to modify the ink composition of Hirasa by adding a 1,2-alkyldiol from the ink composition of Hayashi. According to the examiner, the skilled person would have been motivated to make this modification because Hayashi teaches that the 1,2-alkyldiol “improve[s] color development, effectively prevent[s] feathering or bleeding in prints, and [...] improve[s] storage stability of the ink.”

This argument is flawed because it presumes that (a) these properties needed to be improved in the ink of Hirasa and (b) the skilled person would have had a reasonable expectation that the proposed modification would improve these properties.

Without presumption (a), the examiner’s argument is reduced to an “obvious to try” theory. While the Supreme Court recently pronounced that a modification that is “obvious to try” might be sufficient to show obviousness, it was also careful to place this in the context of limited cases where “[...] there is a design need or market pressure to solve a problem and there are a finite number of identified, predictable solutions, [...]” *KSR International Co. v. Teleflex*

Inc., 82 USPQ2d 1385, 1397 (U.S. 2007). Here, the examiner has failed to identify a problem with the ink of Hirasa that could be solved by making the proposed modification. The examiner has also failed to show that the proposed modification is one of a “finite number of identified [and] predictable solutions.”

With respect to presumption (b), Applicant has previously noted that the art of ink formulation is highly *unpredictable*. As an illustration, Applicant pointed the examiner to the examples of the present application which demonstrate that the addition of a 1,2-alkyldiol can have an inverse impact on different properties of an ink (by improving drytime while worsening firing stability, compare Inks C and E on page 15). The examples also show that for the ink compositions of the present application, these two properties could only be simultaneously improved by keeping a low level of 1,2-alkyldiol while increasing the level of the water-soluble polyurethane at the expense of a styrene-acrylic polymer (JONCRYL™ 586) (compare Inks D and E on page 15). This inventive result could not have been predicted before these experiments were performed. In the latest Office Action, the examiner argues that it “would have been within the skill level of one of ordinary skill in the art to control the amount of 1,2-alkyldiol added to the ink of Hirasa [...] in order that the 1,2-alkyldiol would not negatively effect [sic] the ink.” However, as demonstrated in this application, merely controlling the amount of 1,2-alkyldiol is insufficient to prevent the negative effects on ink properties such as firing stability that are caused by the addition of a 1,2-alkyldiol. The necessary adjustments were therefore unpredictable and form the basis of the claimed invention.

For all of these reasons, Applicant respectfully submits that the Examiner has failed to make a *prima facie* case of obviousness based on the combination of Hirasa and Hayashi. Withdrawal of this rejection is earnestly requested.

Rejection under 103(a) based on Hirasa in view of Hayashi and Iu

The rejection of claims 11-12 under 35 U.S.C. § 103(a) as being unpatentable over Hirasa in view of Hayashi and Iu is hereby traversed, reconsideration is respectfully requested.

As discussed above, the Examiner has failed to establish a *prima facie* case of obviousness with respect to claim 1 based on the combination of Hirasa and Hayashi. Iu is cited as a secondary reference that teaches a co-solvent found in dependent claims 11-12. The Examiner does not point to any teaching in Iu that could remedy the aforementioned deficiencies

in the combined teachings of Hirasa and Hayashi. Since the combination of Hirasa and Hayashi does not render claim 1 obvious and since Iu does not remedy this failure, claims 11-12 that depend from claim 1 cannot be found obvious in light of any combination of the three references. Withdrawal of this rejection is earnestly requested.

Rejection under 103(a) based on Hirasa in view of Hayashi and Ma

The rejection of claims 13-14 under 35 U.S.C. § 103(a) as being unpatentable over Hirasa in view of Hayashi and Ma is hereby traversed, reconsideration is respectfully requested.

As discussed above, the Examiner has failed to establish a *prima facie* case of obviousness with respect to claim 1 based on the combination of Hirasa and Hayashi. Ma is cited as a secondary reference that teaches the desirability of inks with viscosities of less than 10 cps (dependent claims 13-14 require viscosities in the range 1.5 to 6 cps and 2 to 3.4 cps, respectively).⁵ The Examiner does not point to any teaching in Ma that could remedy the aforementioned deficiencies in the combined teachings of Hirasa and Hayashi. Since the combination of Hirasa and Hayashi does not render claim 1 obvious and since Ma does not remedy this failure, claims 13-14 that depend from claim 1 cannot be found obvious in light of any combination of the three references. Withdrawal of this rejection is earnestly requested.

Rejection under 103(a) based on Hirasa in view of Hayashi and Elwakil

The rejection of claims 15-16 under 35 U.S.C. § 103(a) as being unpatentable over Hirasa in view of Hayashi and Elwakil is hereby traversed, reconsideration is respectfully requested.

As discussed above, the Examiner has failed to establish a *prima facie* case of obviousness with respect to claim 1 based on the combination of Hirasa and Hayashi. Elwakil is cited as a secondary reference that teaches a pH range limitation found in dependent claims 15-16. The Examiner does not point to any teaching in Elwakil that could remedy the aforementioned deficiencies in the combined teachings of Hirasa and Hayashi. Since the combination of Hirasa and Hayashi does not render claim 1 obvious and since Elwakil does not

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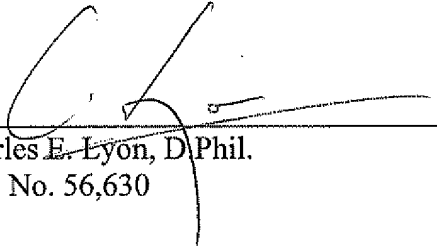
remedy this failure, claims 15-16 that depend from claim 1 cannot be found obvious in light of any combination of the three references. Withdrawal of this rejection is earnestly requested.

Conclusion

Based on the above, Applicant respectfully requests that the Examiner reconsider and withdraw all outstanding rejections and objections. Favorable consideration and allowance are earnestly solicited. Should there be any questions after reviewing this paper, the Examiner is invited to contact the undersigned at 617-248-4793. It is not believed that extensions of time or fees for net addition of claims are required, beyond those which may otherwise be provided for in documents accompanying this paper. However, in the event that additional extensions of time are necessary, then such extensions of time are hereby petitioned under 37 C.F.R. § 1.136(a), and any fees required for consideration of this paper (including fees for net addition of claims) are authorized to be charged in two copies of an Amendment Transmittal Letter filed herewith.

Respectfully submitted,
CHOATE, HALL & STEWART

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Charles E. Lyon, D.Phil.
Reg. No. 56,630

On behalf of:
HEWLETT-PACKARD COMPANY
Intellectual Property Administration
P.O. Box 272400
Fort Collins, CO 80527-2400